QA-ST MKII
Electrical Safety Tester
(US Model)

Getting Started Guide

Fluke Electronics Corporation
Biomedical Systems (METRON Product Group)
5200 Convair Drive
Carson City, NV 89706

Customer Support and Sales

Phone (US Toll Free): 800.648.7952
Phone (Outside the US): 775.883.3400
FAX: 775.883.9541
E-Mail: sales@flukebiomedical.com
Internet: www.flukebiomedical.com

Service

Phone (US Toll Free): 888.993.5853
Phone (Outside the US): 425.446.5560
E-Mail: service@fluke.com

Notices

Disclaimer

METRON provides this publication as is without warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability or fitness for any particular purpose. Further, METRON reserves the right to revise this publication and to make changes from time to time to the content hereof, without obligation on the part of METRON or its local representatives to notify any person of such revision or changes. Some jurisdictions do not allow disclaimers of expressed or implied warranties in certain transactions; therefore, this statement may not apply to you.

Limited Warranty

METRON warrants that the **QA-ST MKII** Electrical Safety Tester will substantially conform to published specifications and to the documentation, provided that it is used for the purpose for which it was designed. METRON will, for a period of twelve (12) months from date of purchase, replace or repair any defective simulator, if the fault is due to a manufacturing defect. In no event will METRON or its local representatives be liable for direct, indirect, special, incidental, or consequential damages arising out of the use of or inability to use the **QA-ST MKII** Electrical Safety Tester, even if advised of the possibility of such damages. METRON and its local representatives are not responsible for any costs, loss of profits, loss of data, or claims by third parties due to use of, or inability to use the **QA-ST MKII** Electrical Safety Tester. Neither METRON nor its local representatives will accept, nor be bound by any other form of guarantee concerning the **QA-ST MKII** Electrical Safety Tester other than this guarantee. Some jurisdictions do not allow disclaimers of expressed or implied warranties in certain transactions; therefore, this statement may not apply to you.

Safety Notice

The **QA-ST MKII** Electrical Safety Tester performs tests in accordance with several electrical safety standards. In the process of this testing, voltages of up to 300 Vac may be present in the test leads, outlet, and/or enclosure of the Device Under Test. Use all applicable electrical safety measures.

Table of Contents

1 Terms and Abbreviations

Chassis = Enclosure
DUT = Device Under Test
Earth = Ground
Enclosure = Chassis
Ground = Earth
NC = Normal Condition
OE = Open Earth
ON = Open Neutral
RM = Reverse Mains

This symbol indicates that mains voltage or higher will be present in the test leads. In addition, the enclosure may be raised to mains voltage levels or higher.

2 Setup for Manual Testing

1. Plug the unit into a wall outlet with power.

2. Confirm that the **only** lights illuminated are the two lights in the **inlet power** indicator (boxed in blue). If either of these lights is not illuminated, or if any other combination of lights is illuminated, examine the wall outlet for problems in grounding or polarity.

   NOTE: DO **NOT** USE extension cords or power strips when testing with the **QA-ST MKII**.

3. Connect the test cable to the **Enclosure** port on the right side of the unit.

4. Connect the test cable clamp to the metal enclosure of your DUT.

5. Connect the patient leads to the **Patient leads** ports in numerical order.

6. Perform any of the **QA-ST MKII** electrical safety tests.

3 Setup for Automated Testing

1. Perform all steps under “Setup for Manual Testing” on the previous page.

2. Connect one end of the NULL-modem cable to the RS-232 port on the left side of the **QA-ST MKII**.

3. Connect the other end of the NULL-modem cable to an applicable COM port on your computer.

4. Consult the *ansur test executive User Manual* and the *ansur QA-ST Plug-In User Manual* for instructions on building and executing the automated test templates.

5. Perform any of the **QA-ST MKII** electrical safety tests.

4 Tests

For each test listed below, the following information is provided: test name, unit of measure, and options. (“Options” include assorted, user-selectable power conditions, as well as the AC/DC measurement selection.)

AC/DC Measurement Selection
To select AC or DC measurements when the selection is available, press the **AC/DC** button. The display will reflect the change in measurement type.

OE – Open Earth Test
This test will break the connection of the Earth power line to the DUT. To select Open Earth measurements when the selection is available, press the **open gnd** button. The display will reflect the change in measurement type.

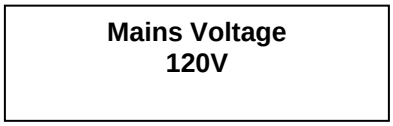
ON – Open Neutral Test
This test will break the connection of the Neutral/L2 power line to the DUT. To select Open Neutral measurements when the selection is available, press the **open neutral** button. The display will reflect the change in measurement type.

(Tests, continued)

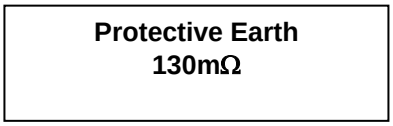
RM – Reverse Mains Test
This test will break both the Live/L1 and Neutral/L2 power lines to the DUT. It will then reverse the normal connection, so that what was Live/L1 is now Neutral/L2, and what was Neutral/L2 is now Live/L1. To choose Reverse Mains measurements when the selection is available, press the **rev. pol** button. The display will reflect the change in measurement type.

⇒ **Warning!** When testing units that have a large inductive load (motor), always turn OFF the DUT **BEFORE** reversing Mains.

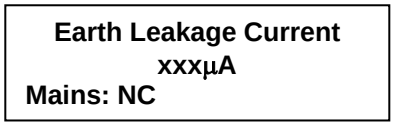
Mains Voltage Test – "V"
This test measures the mains voltage, in volts, between Live and Neutral. Press the **V** button below the **line voltage** label, and the result will be displayed.



Protective Earth Test – "mΩ"
This test measures the resistance, in milliohms, between the enclosure of the DUT and Earth contact on the front outlet. To execute the test and display the results, connect the test lead to the enclosure of the DUT, and then press the **mΩ** button below the **gnd wire res** label.

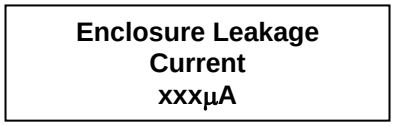


Earth Leakage Current Test – "μA" – ON, RM
This test measures the current, in microamps, passing through the Earth lead. To execute the test and display the results, press the **earth** button below the **leakage current** label.



⇒ **Warning!** When testing units that have a large inductive load (motor), always turn OFF the DUT **BEFORE** reversing Mains.

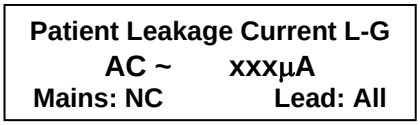
Enclosure Leakage Current Test – "μA" – OE, ON, RM, OERM, ONRM
This test measures the leakage current, in microamps, between the enclosure of the DUT and Earth contact on the front outlet. To execute the test and display the results, connect the test lead to the enclosure of the DUT, and then press the **enclosure** button below the **leakage current** label.



⇒ **Warning!** When testing units that have a large inductive load (motor), always turn OFF the DUT **BEFORE** reversing Mains.

(Tests, continued)

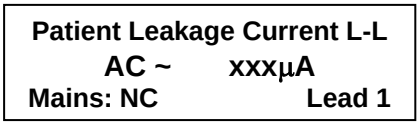
Patient Leakage Current Lead-to-Ground Test "µA" – AC/DC, OE, ON, RM, OERM, ONRM



This test measures the current, in microamps, from the patient leads to Ground. To display the result of all leads in parallel to Ground, press the **lead to GND** button below the **patient leakage current** label. To display the leakage of an individual patient lead to Ground, repeatedly press the **lead to GND** button to cycle through the lead selections (1-10).

⇒ **Warning!** When testing units that have a large inductive load (motor), always turn OFF the DUT **BEFORE** reversing Mains.

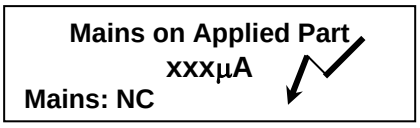
Patient Leakage Current Lead-to-Lead Test – "µA" – AC/DC, OE, ON, RM, OERM, ONRM



This test measures the current, in microamps, from the selected patient lead to all other patient leads in parallel. To select and display the leakage of an individual patient lead to all other leads in parallel, repeatedly press the **lead to lead** button below the **patient leakage current** label to cycle through the lead selections (1-10).

⇒ **Warning!** When testing units that have a large inductive load (motor), always turn OFF the DUT **BEFORE** reversing Mains.

Mains on Applied Part Test "µA" – RM



This test measures the current, in microamps, from the patient leads to Ground when the patient leads are excited by 110% of mains voltage. To execute the test, press and hold the **lead ISO** button. The test will stop when the **lead ISO** button is released.

⇒ **Warning!** When testing units that have a large inductive load (motor), always turn OFF the DUT **BEFORE** reversing Mains.

Appendix A Specifications QA-ST MK II US

SUPPLY VOLTAGE MEASUREMENT

Range: 90 - 125V
Accuracy: ± (2 % of reading + 2 digits)
Resolution: 1 V

CURRENT CAPACITY

15 Amps @ 100 Volts (15 Amps limited duration)

15 Amps @ 120 Volts (15 Amps limited duration)

GROUND WIRE RESISTANCE MEASUREMENTS

- Test current: AC Source – 200 mA
- Test current accuracy: (+5 % of reading)
- Range: 0 - 1999 mΩ
- Accuracy: ± (2 % of reading + 10 mΩ)
- Resolution: 1 mΩ

LEAKAGE CURRENT

- Range: 0 – 1999 µA RMS
- Accuracy: DC and 25 to 1 kHz ± (2 % of reading + 3 µA)
- Resolution: 1 µA

PATIENT LEAKAGE CURRENT MEASUREMENTS (DC AND AC)

- Range: 0 – 1999 µA
- Accuracy: DC and 25 to 1 kHz, ± (2 % of reading + 3 µA)
- Resolution: 1 µA
- Test modes: AC and DC measurements.

LEAD ISO MEASUREMENTS

- Range: 0 – 6000 µA RMS
- Accuracy: DC and 25 to 1 kHz, ± (2 % of reading + 3 µA)
- Resolution: 1 µA

INPUT IMPEDANCE

1000 ohm, AAMI ES1-1993 load or IEC 60601-1 load

POWER CONSUMPTION

110 V (50/60 Hz) = 200 mA
115 V (50/60 Hz) = 200 mA

GENERAL INFORMATION

Temperature Requirements:
+ 15/59 to + 35/95 °C/F while operating
0 to + 50/122 °C/F for storage

Display:
Type: LCD
Graphical: 122 x 32 pixels
Display control: Keypad

Power: 100 V 50/60 Hz

Housing: Plastic case

Dimensions: D x W x H
191mm x 135mm x 45mm

Weight: 930 g

Standard Accessories:
User Manual
Test lead
10 Universal snap to banana adapters

Appendix B Ordering Information

11046, QA-ST MKII Electrical Safety Tester, US Model (Part Number 2462722)

Accessories:

11042, User Manual, CD (Part Number 11042)

11150, Carrying Case (Part Number 2462192)

17260, Hard Case (Part Number 2462161)

17358, Test lead (Kelvin cable) (Part Number 2568891)

17024, Universal banana adapter (Part Number 2462072)

11050, ansur QA-ST Plug-In (Part Number 2463002)

15403, Data transfer cable, RS-232 (Part Number 15403)